Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection
Northeast Regional Office • 205B Lowell Street, Wilmington MA 01887 • 978-694-3200

June 29, 2015

Mr. Lawrence Cardarelli
Director Engineering and Maintenance
Lahey Clinic Hospital, Inc.
41 Mall Road
Burlington, MA 01805

RE: Burlington
Transmittal No.: X256169
Application No.: NE-13-020
Class: SM-50
FMF No.: 130446
AIR QUALITY PLAN APPROVAL

Dear Mr. Cardarelli:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Non-major Comprehensive Plan Application ("Application") listed above. This Application concerns the construction and operation of a new Combined Heat and Power ("CHP") system at your medical facility located at 29, 31, and 41 Mall Road in Burlington, Massachusetts ("Facility"). The Application bears the seal and signature of Mr. Manuel T. Rei, Massachusetts Registered Professional Engineer number 33732.

This Application was submitted in accordance with Regulation 310 CMR 7.02 Plan Approval and Emission Limitations as contained in Regulation 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-J, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements. MassDEP and Lahey Clinic Hospital, Inc. ("Lahey") entered into ACOP No. ACOP-NE-14-9006-27-SEP-EMS, in part to resolve a violation of Regulation 310 CMR 7.02 concerning the installation and operation of the CHP system, described in Section 1 below, without prior MassDEP Approval.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Facility owner/operator ("Permittee") must comply in order for the Facility to be operated in compliance with this Plan Approval.

1. DESCRIPTION OF FACILITY AND APPLICATION

A. Facility and Equipment

Lahey has installed (ACOP No. ACOP-NE-14-9006-27-SEP-EMS) one new natural gas fired Caterpillar Model TCG2032V12 spark ignition internal combustion engine-generator set with maximum rating of 3,000 kilowatt ("kW") electric power output with thermal energy recovered from the engine exhaust gases in a heat recovery steam generator ("HRSG") which is not equipped with a duct burner for supplemental firing, as a combined heat and power project per Regulation 310 CMR 7.26(43) Engines and Turbines and Regulation 310 CMR 7.26(45), Industry Performance Standards, Combined Heat and Power (CHP). This new Emission Unit is designated as CHP1.

Regulation 310 CMR 7.26(45)(a)3 requires CHP1 to comply with Regulation 310 CMR 7.02(5)(c), Plan Approval and Emission Limitations, Comprehensive Plan Application ("CPA"). The Permittee submitted CPA-FUEL Application Number NE-13-020 for the CHP system.

In addition to the CHP project, Lahey has recently installed one 1500 kW emergency diesel generator, Emission Unit ("EU") D-K, subject to Regulation 310 CMR 7.26(42), Industry Performance Standards, Emergency Engines and Turbines. Regulation 310 CMR 7.26(42) requires the Facility to certify compliance with Regulation 310 CMR 7.26(42) in its entirety in accordance with the provisions of Regulation 310 CMR 70.00 *Environmental Results Program Certification,* for the installation and operation of said emergency generator, within sixty (60) days of commencement of its operation.

The Permittee has indicated that CHP1 is subject to Federal Regulation at 40 CFR 60 Subpart JJJJ and that EU D-K is subject to 40 CFR Part 60 Subpart IIII. Other emission units at the Facility may be subject to Federal Regulation at 40 CFR Part 63, Subpart ZZZZ. Since MassDEP has not accepted delegation for Subparts IIII, JJJJ, or ZZZZ for sources which are not subject to 310 CMR 7.00: Appendix C, the Permittee is advised to consult with EPA Region 1 at 5 Post Office Square, Suite 100, Boston, MA 02109-3912, telephone: (617)918-1111. Other applicable requirements may include emission limit, notification, record keeping, and reporting requirements.

In addition to CHP1 and EU D-K, the existing Facility consists of eight (8) boilers, one (1) water heater, three (3) make up air units, one (1) humidifier steam generator, and six (6) emergency generators. Two (2) 520 kW emergency generators, previously existing at the Facility, have been removed from service. Air Quality dispersion modeling demonstrated to the satisfaction of the MassDEP Air Quality Modeling Group that that the facility will neither cause nor contribute to any violations of state or federal air standards.

The existing Facility is considered a minor source of air pollution, having emission restrictions on its Facility-wide federal potential to emit nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide ("CO"), volatile organic compounds ("VOC"), and particulate matter having a diameter of less than 10 microns ("PM_{10}") to below major source thresholds via Plan Approval

Nos. MBR-97-COM-006 and MBR-06-COM-001, both issued pursuant to Regulation 310 CMR 7.02. Said Approvals shall be superseded (please see Special Terms and Conditions, Table 6 of this Approval). The Facility-wide emissions restrictions contained within said Approvals shall be superseded with the Facility-wide emission limits contained in Table 2 below. As shown in Table 2 the Facility shall remain a minor source of air pollution so long as the Facility complies with the Facility-wide emission limits contained in Table 2.

B. Applicable Emission Limitations for CHP Project

CHP1 is subject to Industry Performance Standards in Regulation 310 CMR 7.26(43) Engines and Turbines. The Permittee has proposed use of the methodology in Regulation 310 CMR 7.26(45) Combined Heat and Power (CHP) whereby emission credits are utilized in determining compliance of a CHP installation with the emission limitations contained in Regulation 310 CMR 7.26(43). As shown in Table A below, Regulation 310 CMR 7.26(43) sets emissions limitations that must be met by new internal combustion engines for the following air contaminants: NO_X, CO, and carbon dioxide ("CO_2").

Regulation 310 CMR 7.26(45) provides a methodology to calculate emission credits for NO_X, CO and CO_2 based on the emissions that would have been created by a conventional separate system used to generate the same thermal output. The emission credits may be used to determine compliance of CHP1 with Regulation 310 CMR 7.26(43) emission limitations. Pursuant to Regulation 310 CMR 7.26(45)(b)7., the emissions determined by this methodology satisfy the requirements of Regulation 310 CMR 7.02(8)(a)2., Best Available Control Technology ("BACT") (please see Table 2 of this Approval).

Table A
CHP Emission Credits and ERP Compliance Demonstration for CHP1

EU#	Air Contaminant	Emission Limit Per 310 CMR 7.26(43) in lbs/MWh	Emission Credits per 310 CMR 7.26(45) in lbs/MWh	Converted Emission Limit for CHP1 per 310 CMR 7.26(45) in lbs/MWh
CHP1	NO_X	0.15	0.096	0.246
	CO	1	0.22	1.22
	CO_2	1650	None[1]	1650[1]
	Smoke & Opacity	Not to exceed the limits contained in 310 CMR 7.26(43)(d)4., which references 310 CMR 7.06(1)(a) & (b)		

Table A Notes:
1: None: Based on manufacturer supplied CO_2 emission rates, CHP1 is expected to comply with the applicable CO_2 emission limitation in Regulation 310 CMR 7.26(43). Therefore the Permittee has not proposed to utilize Emission Credits per Regulation 310 CMR 7.26(45) to comply with 310 CMR 7.26(43) for CO_2.

Table 1 Key:
CHP = Combined Heat and Power
ERP = Industry Performance Standards at 310 CMR 7.26(43) and 310 CMR 7.26(45)
EU# = Emission Unit Number
NO_X = Nitrogen Oxides
CO = Carbon Monoxide

CO_2 = Carbon Dioxide
lbs/MWh = pounds per megawatt hour

2. EMISSION UNIT IDENTIFICATION

Each Emission Unit (EU) identified in Table 1 is subject to and regulated by this Plan Approval:

Table 1

EU#	Description	Design Capacity	Pollution Control Device ("PCD")
CHP1 (41 Mall Road)	Natural gas fired Caterpillar Model TCG2032V12 spark ignition internal combustion engine-generator set rated at 3,000 kW electric power output with thermal energy recovered from the engine exhaust gases in a heat recovery steam generator (installed, hereby approved)	25.9 MMBtu/hr	PCD1, Selective Catalytic Reduction ("SCR") and PCD2, Oxidation Catalyst
D-K (41 Mall Road)	Diesel fired Caterpillar emergency generator (installed per Regulation 310 CMR 7.26)	1,500 kW	Active particulate filter
D-C (41 Mall Road)	Diesel fired Caterpillar Model 3508B Emergency generator (installed per Approval No. MBR-97-COM-006)	1,000 kW	Active particulate filter
D-D (41 Mall Road)	Diesel fired Caterpillar Model 3512B Emergency generator (installed per Approval No. MBR-06-COM-001)	1,500 kW	Active particulate filter
D-E (41 Mall Road)	Diesel fired Emergency generator (exempt per Regulation 310 CMR 7.03)	500 kW	None
D-F (29 Mall Road)	Diesel fired Emergency generator (exempt per Regulation 310 CMR 7.03)	800 kW	
D-G (29 Mall Road)	Diesel fired Emergency generator (exempt - below permitting thresholds)	60 kW	
D-J (31 Mall Road)	Diesel fired Emergency generator (exempt per Regulation 310 CMR 7.02(2)(b)8)	15 kW	
B-1 (41 Mall Road)	Natural gas or No. 2 fuel oil fired Boiler (installed per Regulation 310 CMR 7.26)	12.31 MMBtu/hr	
B-2 (41 Mall Road)	Natural gas or No. 2 fuel oil fired Boiler (installed per Regulation 310 CMR 7.26)	25.1 MMBtu/hr	
B-3 (41 Mall Road)	Natural gas or No. 2 fuel oil fired Boiler (replacement unit for unit installed per Approval 77-CO-046)	25.1 MMBtu/hr	
B-4 (41 Mall Road)	Natural gas or No. 2 fuel oil fired Boiler (installed per Approval MBR-90-COM-001)	12.5 MMBtu/hr	
B-5 (41 Mall Road)	Four Natural gas fired 0.3 MMBtu/hr Boilers served by a single, shared stack (exempt per Regulation 310 CMR 7.02(2)(b)15)	1.2 MMBtu/hr	
B-6A (29 Mall Road)	Natural gas fired Boiler (exempt per Regulation 310 CMR 7.02(2)(b)15)	2.1 MMBtu/hr	

Table 1			
EU#	**Description**	**Design Capacity**	**Pollution Control Device ("PCD")**
B-6B (29 Mall Road)	Natural gas fired Boiler (exempt per Regulation 310 CMR 7.02(2)(b)15)	2.1 MMBtu/hr	None
B-7 (29 Mall Road)	Natural gas fired water heater (exempt per Regulation 310 CMR 7.02(2)(b)15)	0.25 MMBtu/hr	
B-8 (31 Mall Road)	Natural gas or No. 2 fuel oil fired Boiler (exempt per Regulation 310 CMR 7.02(2)(b)15)	2.7 MMBtu/hr	
B-9 (31 Mall Road)	Natural gas fired Humidifier Steam Generator (exempt per Regulation 310 CMR 7.02(2)(b)15)	0.3 MMBtu/hr	
Ah-1 (31 Mall Road)	Natural gas fired Make-up Air Unit (exempt per Regulation 310 CMR 7.02(2)(b)15)	0.8 MMBtu/hr	
RTU-1 (31 Mall Road)	Natural gas fired Make-up Air Unit (exempt per Regulation 310 CMR 7.02(2)(b)15)	0.25 MMBtu/hr	
RTU-2 (31 Mall Road)	Natural gas fired Make-up Air Unit (exempt per Regulation 310 CMR 7.02(2)(b)15)	0.25 MMBtu/hr	

Table 1 Key:
EU# = emission unit number kW = kilowatt MMBtu/hr = 1,000,000 British thermal units per hour

3. APPLICABLE REQUIREMENTS

A. Operational, Production and Emission Limits

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2:

Table 2 Approved BACT Emission Limits					
EU#	**Operational / Production Limit**	**Air Contaminant**	**Emission Limit**		
			lbs/MWh	**lbs/hr**	**TPY**
CHP1[1]	Natural gas shall be the only fuel fired The Permittee shall, to the extent practical, maintain and operate the engine in a manner consistent with good air pollution control practices for minimizing emissions	NO_X	0.246[2]	0.74	3.24
		CO	1.22[2]	2.32	10.16
		CO_2	1650	4950	21,681
		VOC	0.183	0.55	2.4
		$PM_{2.5}$	0.13	0.36	1.6
		SO_2	0.005	0.015	0.07
		NH_3	5 ppmv	0.11	0.48
		Smoke and Opacity	Not to exceed the limits contained in 310 CMR 7.26(43)(d)4., including references to 310 CMR 7.06(1)(a) & (b) therein		

Table 2
Approved BACT Emission Limits

EU#	Operational / Production Limit from Approval MBR-97-COM-006	Air Contaminant	Emission Limit from Approval MBR-97-COM-006	
			Grams per brake horsepower hour	TPY
D-C	Only operate during power failures and for a one hour test/maintenance period per week, ≤ 14,360 gallons per month, ≤ 21,540 gallons per consecutive twelve month period, ≤ 300 hours of operation per any consecutive twelve month period	NO_X	8.53	4.11
		CO	1.29	0.615
		VOC	0.71	0.345
		SO_2	0.69	0.335
		TSP	0.25	0.118

EU#	Operational / Production Limit from Approval MBR-06-COM-001	Air Contaminant	Emission Limit from Approval MBR-06-COM-001			
			Grams per brake horsepower hour	Pounds per hour	TPM	TPY
D-D	Only operate during emergencies as defined in 310 CMR 7.26(41) and for a one hour test/maintenance period (during the daytime only) per week, ≤ 22,840 gallons per month, ≤ 34,260 gallons per consecutive twelve month period, ≤ 300 hours of operation per any consecutive twelve month period	NO_X	6.69	32.41	4.10	4.9
		CO	1.41	6.83	0.83	1.0
		VOC	0.26	1.26	0.17	0.2
		PM	0.14	0.66	0.08	0.1
		SO_2	0.00	0.05	0.008	0.01

Table 2 Approved BACT Emission Limits				
EU#	**Operational / Production Limit**	**Air Contaminant**	**Emission Limit**	
			TPM	**TPY**
Facility-wide	Limit Facility-wide operations and/or fuel usage such that none of the emissions limits contained herein are exceeded	NO_X	16	25
		CO	7	40
		CO_2	10,000	95,000
		VOC	1	7
		$PM_{2.5}$	1	7
		SO_2	1	5
EU#	**Operational / Production Limit and Emission Limit**			
B-1, B-2	Operate in accordance with Regulation 310 CMR 7.26(30)-(37)			
D-K	Operate in accordance with Regulation 310 CMR 7.26(42)			

Table 2 Notes:
1: The BACT NO_x and CO emission limits for CHP1 established in this Plan Approval apply at all times, except during periods of startup and shutdown. MassDEP will determine startup and shutdown emission limits based on MassDEP evaluation of Continuous Emissions Monitoring System data for NO_x and CO. Please see Table 5 below. Notwithstanding the foregoing, pounds per hour emission limits apply at all times.
2: BACT emission limits as calculated in Table A

Table 2 Key:
EU# = emission unit number
BACT = Best Available Control Technologies
NO_X = nitrogen oxides
CO = carbon monoxide
SO_2 = sulfur dioxide
PM = particulate matter
$PM_{2.5}$ = particulates which have particle sizes less than or equal to 2.5 microns ($PM_{2.5}$), including filterable and condensable, per EPA Method 201A and 202 respectively
VOC = volatile organic compounds
CO_2 = carbon dioxide
NH_3 = ammonia
TPM = tons per month
TPY = tons per any consecutive 12-month period
TSP = total suspended particulates
lbs/hr = pounds per hour
lbs/MWh = pounds per megawatt hour, unless otherwise specified
ppmv = parts per million by volume
$\leq$ = less than or equal to

B. Noise

Background sounds were monitored at two locations using a Type 1 noise monitor: near the West property line of the Facility and near the nearest residence on Laurel Hill Lane. The West property line monitoring location was selected on the basis of where sound impact from CHP1 was anticipated to be greatest.

A-weighted sound level ("Db(A)") emphasizes the middle frequency sounds to which the human ear is most sensitive and de-emphasizes lower and higher frequency sounds. The L_{90} level represents the sound level exceeded 90 percent of each hour monitored and is used by MassDEP for the regulation of noise emissions. The lowest A-weighted 90^{th} percentile ("L_{90}") value over the duration of the 48 hour monitoring period at the West property line was 54 Db(A) which serves as the baseline value. The lowest A-weighted 90^{th} percentile ('L_{90}") value over the duration of the monitoring period at the Laurel Hill location was 46 Db(A) which serves as the baseline value. Modeling of Facility noise, performed using the computer program Cadna/A to estimate sound levels at various locations from the existing 1000 kW emergency generator designated as D-C, the existing 1500 kW emergency generator designated as D-D, the Regulation 310 CMR 7.26(42)-subject 1500 kW emergency generator designated as D-K, and the proposed CHP1, indicated compliance with MassDEP Noise Policy 90-001 which limits increases over the existing measured L_{90} background level to 10 dB(A) and prohibits "pure tone" sounds, defined as any octave band level that exceeds the levels in adjacent octave bands by 3 dB(A) or more.

1. The Permittee shall take necessary precautions to ensure that the Facility complies with MassDEP's noise regulation and policy and that the Facility does not cause a condition of air pollution.

2. The Permittee shall ensure that, at a minimum, the following measures or equivalent alternative measures are implemented for noise mitigation:

   I. CHP1:
      i. Use of low speed 12-fan radiator with a rated sound pressure level of 71 dB(A) at 3 meters,
      ii. Use of low speed 8-fan radiator with a rated sound pressure level of 67 dB(A) at 3 meters,
      iii. Engine room supply fans shall each be equipped with a Price ERM-84/4B or equivalent silencer,
      iv. Engine room exhaust inlets shall each be equipped with a Price ERM-102/76 or equivalent silencer,
      v. Exhaust stack shall be equipped with a Silex Model JAT-26 or equivalent silencer, and
      vi. Engine room roll up door shall be a Cornell Model ESD20 or equivalent, having a Sound Transmission Class ("STC") rating of at least 27.

II. D-C and D-K:
   i. Use of acoustical enclosures.
   ii. Use of a "Critical" grade exhaust silencer for noise suppression.

III. D-D:
   i. Use of a "Critical" grade exhaust silencer manufactured by GT Exhaust Systems, Model 201-5114 or equivalent, for noise suppression.
   ii. Use of an acoustical enclosure.

3. MassDEP Noise Policy 90-001 limits increases over the existing L_{90} background level to 10 dB(A). Additionally, "pure tone" sounds, defined as any octave band level that exceeds the levels in adjacent octave bands by 3 dB(A) or more, are also prohibited. The Permittee, at a minimum, shall ensure that the proposed CHP1 complies with said Policy.

4. The allowable noise levels generated from the operation of CHP1, D-C, D-D, and D-K by the Permittee are summarized in Table 2A of this Approval. Further, based on the noise frequency distribution, no combination of sound sources shall result in a "pure tone condition," as previously defined.

TABLE 2A

Noise Location	Baseline (Nighttime Levels) (L_{90}, dB(A))	Total Future Maximum Predicted Plant Generated Noise (Nighttime Levels) (L_{90}, dB(A))	Predicted Increase over Nighttime Baseline (L_{90}, dB(A))
R-1[1]	54[6]	63	+9
R-2[2]	54[7]	57	+3
R-3[3]	54[7]	57	+3
R-4[4]	54[7]	55	+1
R-5[5]	46[6]	47	+2

Table 2A Notes:
1. R-1 represents closest property line location that is to the West
2. R-2 represents property line location that is to the North
3. R-3 represents property line location that is to the Northeast
4. R-4 represents property line location that is to the South
5. R-5 represents nearest residence on Laurel Hill Lane
6. The existing baseline sound value was established based upon actual measurements of sound levels
7. The existing baseline sound value for R-1 was assumed to be representative of property line receptor locations R-2, R-3, and R-4 since it is located in an area least influenced by surrounding neighborhood sources

C. Compliance Demonstration

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5 below:

Table 3	
EU#	**Monitoring and Testing Requirements**
CHP1	1. The Permittee completed installation and certification of a continuous emission monitoring system (CEMS). Said system shall continuously monitor the air emissions for NO_X, CO, and O_2 as a diluent gas to determine the hourly NO_X and CO emission rate in pounds per hour (lb/hr). Please see Table 6, Special Terms and Conditions.
	2. The Permittee conducted initial compliance testing for NO_X, CO, VOC, NH_3 and $PM_{2.5}$ to demonstrate compliance with the emission limitations as specified in Table 2 above. Said testing was conducted in accordance with appropriate test methods and procedures as contained in 40 CFR 60 Appendix A.
	3. The Permittee shall operate the CEMS serving CHP1 at all times, including startup and shutdown periods, except for periods of CEMS calibration checks, zero and span adjustments, preventative maintenance, and periods of unavoidable malfunction.
	4. The Permittee certified the CEMS during the initial certification in accordance with 40 CFR Part 60 Appendix B and ongoing compliance shall be demonstrated in accordance with 40 CFR Part 60 Appendix F.
	5. A RATA for the NO_X, CO and O_2 CEMS shall be conducted at least once every four QA operating quarters but no less frequently than once every eight calendar quarters. If RATA testing is not completed within this timeframe, a 720 unit operating hour grace period may be used, as provided in 40 CFR 75 App. B, §2.3.3. A cylinder gas audit (CGA) for the NO_X, CO, and O_2 CEMS shall be conducted at least once every QA operating quarter but no less frequently than once every four calendar quarters. If CGA testing is not completed within this timeframe, a 168 unit operating hour grace period may be used, as provided in 40 CFR 75, Appendix B §2.2.4. QA operating quarter means a calendar quarter in which there are at least 168 unit operating hours. Unit operating hour means a clock hour during which a unit combusts any fuel, either for part of the hour or for the entire hour. It is not necessary to calibrate the CEMS during calendar days in which the respective unit does not operate.

Table 3	
EU#	**Monitoring and Testing Requirements**
CHP1	6. The Permittee shall monitor to ensure that an adequate supply of spare parts is maintained, as recommended by manufacturer(s), on-site to maintain the air pollution control system and monitoring equipment serving CHP1.
	7. The Permittee shall install, calibrate, test and operate a Data Acquisition and Handling System(s) (DAHS) for the CEMS serving CHP1 and associated air pollution control system operating parameters which shall monitor the following emissions: a. Oxygen (O_2) b. Oxides of Nitrogen (NO_X) c. Carbon Monoxide (CO)
	8. The Permittee shall use and maintain its CEMS as a "direct-compliance" monitor to measure NO_X, CO, and oxygen. "Direct-compliance" monitors generate data that legally documents the compliance status of the Facility. MassDEP will utilize the data generated by "direct-compliance" monitors for compliance and enforcement purposes.
	9. The Permittee shall equip the CEMS with audible and visible alarms to activate whenever emissions exceed the limits established in Table 2 of this Approval.
	10. The Permittee shall monitor all periods of excess emissions from the subject engine, even if attributable to an emergency/malfunction or start up/shutdown. Said excess emissions shall be quantified and included by the Permittee in the determination of and compliance with the emission limitations as stated in this Approval. (**"Excess Emissions"** are defined as emissions, which are in excess of the short-term emission limitations as stipulated in Table 2 of this Approval.).
	11. The Permittee shall ensure that CHP1 can accommodate the emissions testing requirements as stipulated in 40 CFR Part 60, Appendix A or the latest test methods recommended by USEPA.
	12. The Permittee shall conduct a noise survey (during daytime and nighttime operation), which is in accordance with MassDEP guidelines, to demonstrate that the noise impacts from the operation of the subject equipment are in compliance with Regulation 310 CMR 7.10 and the Bureau of Air and Waste's Noise Policy No. 90-001. This survey shall be conducted within 45 days of commencement of continuous operation of CHP1. Please see Table 5 below for associated reporting requirements.
	13. The Permittee shall equip CHP1 with a fuel meter and recorder and all fuel usage shall be monitored.
	14. The Permittee shall equip CHP1 with an hour meter and recorder and all periods of usage shall be monitored.
	15. The Permittee shall install and operate continuous sensors and alarm systems to monitor temperatures at the inlet to PCD1 and PCD2.

Table 3	
EU#	**Monitoring and Testing Requirements**
CHP1	16. The Permittee shall obtain and record emission data from the CEMS for at least 75% of operating hours per day, for at least 75% of operating hours per month, and for at least 95% of operating hours per quarter, except for periods of CEMS calibration checks, zero and span adjustments, and preventative maintenance.
D-C, D-D	17. The Permittee shall monitor run time in each generator in order to verify compliance with the operational limits in Table 2 of this Approval.
Facility-Wide	18. The Permittee shall monitor all operations to ensure sufficient information is available to comply with Regulation 310 CMR 7.12, Source Registration.
	19. If and when MassDEP requires it, the Permittee shall conduct emission testing in accordance with USEPA Reference Test Methods and Regulation 310 CMR 7.13.

Table 3 Key:
EU# = Emission Unit Number
NO_X = Nitrogen Oxides
CO = Carbon Monoxide
O_2 = Oxygen
$PM_{2.5}$ = Particulate matter having a particle size less than or equal to 2.5 microns
VOC = Volatile Organic Compounds
NH_3 = Ammonia
USEPA = United States Environmental Protection Agency
CFR = Code of Federal Regulations
RATA = Relative Accuracy Test Audit
SO_2 = Sulfur Dioxide
PCD = Pollution Control Device
SOMP = Standard Operating and Maintenance Procedures
CEMS = Continuous Emissions Monitoring System

Table 4	
EU#	**Record Keeping Requirements**
CHP1	1. The Permittee shall continuously record the emissions of NO_X, CO, and O_2 as a diluent gas.
	2. The Permittee shall maintain all records generated by its Data Acquisition and Handling System(s) (DAHS) for the CEMS serving CHP1, including associated air pollution control system operating parameters and the following: a. O_2 b. NO_X c. CO

Table 4	
EU#	**Record Keeping Requirements**
CHP1	3. The Permittee shall compile the startup and shutdown CEMS emissions data records for NO_x and CO to be used to determine the proposed startup and shutdown emission limits and durations for CHP1. Emissions data generated from this compilation shall be submitted for review by MassDEP prior to determining and approving the maximum allowable emissions, for these periods of time. Please see Table 5 below for associated reporting requirements.
	4. All periods of excess emissions from the subject equipment, even if attributable to an emergency/malfunction or start up/shutdown, shall be quantified and included by the Permittee in the determination of rolling 12-month period emissions and compliance with the rolling 12-month period emission limitations as stated in Table 2 of this Plan Approval. (**"Excess Emissions"** are defined as emissions, which are in excess of the short-term emission limitations as stipulated in Table 2.).
	5. The Permittee shall maintain records of information on equipment type, identification of make and model, and maximum power output.
	6. The Permittee shall maintain monthly logs of hours of operation, quantity of fuel used, and heating value of the fuel. A monthly calculation of both the total hours operated and fuel used in the previous twelve months shall be kept onsite for a minimum of five years and shall be made available to MassDEP personnel upon request. The Permittee shall maintain records of purchase orders, invoices and other documents to support information in the monthly log as well as certificates and documents from the manufacturer related to certificates.
	7. The Permittee shall maintain a record of routine maintenance activities performed on the approved EU(s), PCD(s) and monitoring equipment. The records shall include, at a minimum, the type or a description of the maintenance performed and the date and time the work was completed.
	8. The Permittee shall maintain a record of all malfunctions affecting air contaminant emission rates on the approved EU(s) and PCD(s) and monitoring equipment. At a minimum, the records shall include: date and time the malfunction occurred; description of the malfunction; corrective actions taken; the date and time corrective actions were initiated and completed; and the date and time emission rates and monitoring equipment returned to compliant operation.
D-C, D-D	9. The Permittee shall maintain a record of run time in each generator in order to verify compliance with the operational limits in Table 2 of this Approval.
Facility-Wide	10. The Permittee shall maintain records to ensure sufficient information is available to comply with Regulation 310 CMR 7.12 Source Registration.

Table 4	
EU#	**Record Keeping Requirements**
Facility-Wide	11. The Permittee shall maintain adequate records on-site to document the compliance status with all operational, production, and emission limits contained in Table 2 above. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve-month period (current month plus prior eleven months). These records shall be compiled no later than the 15th day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at http://www.mass.gov/dep/air/approvals/aqforms.htm#report .
	12. The Permittee shall maintain records required by this Plan Approval on-site for a minimum of five (5) years.
	13. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.
	14. The Permittee shall maintain records of monitoring and testing as required by Table 3.
	15. The Permittee shall maintain a copy of this Plan Approval, underlying Application and the most up-to-date SOMP for the EU(s) and PCD(s) on-site.

Table 4 Key:
EU# = Emission Unit Number
NO_X = Nitrogen Oxides
CO = Carbon Monoxide
O_2 = Oxygen
SO_2 = Sulfur Dioxide
$PM_{2.5}$ = Particulate matter having a particle size less than or equal to 2.5 microns
VOC = Volatile Organic Compounds
USEPA = United States Environmental Protection Agency
PCD = Pollution Control Device
SOMP = Standard Operating and Maintenance Procedures
CEMS = Continuous Emissions Monitoring System

Table 5	
EU#	**Reporting Requirements**
CHP1	1. The Permittee submitted a test protocol, describing the test methods for NO_X, CO, VOC, $PM_{2.5}$ and NH_3 initial compliance testing and procedures for NO_X, CO, VOC, $PM_{2.5}$ and NH_3 optimization/ minimization, sampling point locations, sampling equipment, sampling and analytical procedures, and the operating conditions for the required testing to this Office, attention Bureau of Air and Waste Permit Chief, for review and MassDEP approval prior to the commencement of initial compliance testing at the facility.

Table 5	
EU#	**Reporting Requirements**
CHP1	2. The Permittee submitted to MassDEP a final stack test results report for initial emission testing as defined in Table 3 Monitoring and Testing Requirements.
	3. The Permittee shall ensure that the results of the conducted noise survey (during daytime and nighttime operation) required in Table 3 above, shall be submitted to this Office, in writing, attention Permit Chief, Bureau of Air and Waste, within 60 days of the commencement of continuous operation of the subject equipment.
	4. The Permittee shall submit to MassDEP the **startup** and **shutdown** CEMS emissions data records for NO_x and CO to be used to determine the startup and shutdown emission limits for CHP1. **The Permittee shall submit emission data generated from this compilation including proposed emission limits and durations to MassDEP within twelve (12) months of commencement of continuous operation of CHP1.** MassDEP will incorporate these limits into an Approval for CHP1 startup and shutdown emission limits and, upon issuance, said limits during such times shall be considered enforceable.
	5. Within seven days of commencement of continuous operation of CHP1, the Permittee shall submit to MassDEP a notification of the date of commencement of continuous operation. In said notification, the Permittee shall also include the Permittee's resultant deadline dates for completing the following required actions: a. conducting the required noise survey, b. submitting the results of the required noise survey in writing to MassDEP, c. submitting the required CEMS record of startup and shutdown data and the proposed emission limits and associated durations for said periods to MassDEP in writing.
	6. The Permittee shall develop a Quality Assurance/Quality Control ("QA/QC") Plan for the operation of the CEMS serving CHP1. The QA/QC Plan must be submitted in writing for review and approval by MassDEP within 60 days of receipt of this Plan Approval. Said QA/QC Plan shall address all Quality Assurance requirements as specified in 40 CFR Part 60, Appendices B and F including, but not limited to, daily zero and span calibrations and quarterly audits including cylinder gas audits and Relative Accuracy Test Audits. Said submittal shall also contain information including sample transport, data acquisition and handling procedures, alarm limits and alert notifications, auto-shutdown levels, maintenance procedures including frequency, spare parts inventory, data validation and flagging, corrective actions and report generation. Said QA/QC Plan shall also include identification of the party responsible for conducting the daily calibrations and other maintenance activities, the party responsible for taking corrective actions in response to alarms, and the party responsible for submitting required quarterly QA/QC reports and deviation reports.

Table 5	
EU#	**Reporting Requirements**
CHP1	7. The Permittee shall submit the Final SOMP concerning the subject equipment to this Office, attention Permit Chief, Bureau of Air and Waste, within 60 days of receipt of this Plan Approval. The Final SOMP shall include standard operating and maintenance procedures for CHP1, the associated PCD1 and PCD2, CEMS, and DAHS.
	8. The Permittee shall submit any subsequent revision(s) made to the Final SOMP concerning the subject equipment, to this Office, attention Permit Chief, Bureau of Air and Waste, within 15 days of said revision(s).
	9. The Permittee shall submit quarterly excess emission and data capture reports to MassDEP. Each report shall be submitted by the 30th of the following month after the end of each quarter. Said reports shall be submitted by April 30, July 30, October 30, and January 30 of each year and shall contain at least the following quarterly information: a. The facility CEMS excess emission data, in a format acceptable to MassDEP. b. For each period of all excess emissions or excursions from allowable operating conditions, the Permittee shall list the duration, cause, the response taken, and the amount of excess emissions. Periods of excess emissions shall include periods of startup, shutdown, malfunction, emergency, and upsets or failures associated with the emission control system or CEMS. (**"Malfunction"** means any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions. **"Emergency"** means any situation arising from sudden and reasonably unforeseeable events beyond the control of this source, including acts of God, which situation would require immediate corrective action to restore normal operation, and that causes the source to exceed a technology based limitation under the Approval, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operations, operator error or decision to keep operating despite knowledge of these things.) c. A tabulation of periods of operation of the subject equipment. d. The facility CEMS data capture which shows the facility's compliance status with regard to the required hours per day, hours per month and hours per quarter data capture and recording requirements contained in Table 3 above.
Facility-Wide	10. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a "Responsible Official" as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).

Table 5	
EU#	**Reporting Requirements**
Facility-Wide	11. The Permittee shall notify the Northeast Regional Office of MassDEP, BAW Permit Chief by email at NERO.Air@massmail.state.ma.us or fax at 978-694-3499, as soon as possible, but no later than three (3) business days after discovery of an exceedance(s) of Table 2 requirements. A written report shall be submitted to BAW Permit Chief at MassDEP within ten (10) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).
	12. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within 30 days from MassDEP's written request.
	13. The Permittee shall report every three years to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The Permittee shall note therein any minor changes (under 310 CMR 7.02(2)(e), 7.03, 7.26, etc.), which did not require Plan Approval.
	14. The Permittee shall, by March 15th of each year, submit an Annual Emissions Report to this Office containing the actual emissions rates in tons, on both a monthly and consecutive twelve month time period. The MassDEP approved Report Form in Microsoft Excel format can be downloaded at http://www.mass.gov/dep/air/approvals/aqforms.htm#report.

Table 5 Key:
EU# = Emission Unit Number
NO_X = Nitrogen Oxides
CO = Carbon Monoxide
O_2 = Oxygen
SO_2 = Sulfur Dioxide
$PM_{2.5}$ = Particulate matter having a particle size less than or equal to 2.5 microns
VOC = Volatile Organic Compounds
USEPA = United States Environmental Protection Agency
PCD = Pollution Control Device
SOMP = Standard Operating and Maintenance Procedures
CEMS = Continuous Emissions Monitoring System
DAHS =Data Acquisition and Handling System

4. SPECIAL TERMS AND CONDITIONS

A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

Table 6	
EU#	**Special Terms and Conditions**
CHP1	1. The Permittee shall ensure that a copy of this Approval letter and the Standard Operating and Maintenance Procedure for the subject CHP1, PCD1 and PCD2, CEMS and DAHS equipment shall be affixed at or adjacent to the subject equipment.
	2. The Permittee shall ensure that PCD1 and PCD2 operate whenever CHP1 is operated, including start-up and shutdown, except that PCD1 shall be placed in operation only after the exhaust gas temperature across PCD1 reaches approximately 540 degrees Fahrenheit.
	3. The Permittee shall ensure that CHP1 shall comply with all applicable requirements of 40 CFR Part 60, New Source Performance Standards, Subpart JJJJ.
	4. The Permittee shall comply with all applicable requirements of Regulations 310 CMR 7.26(43) and 310 CMR 7.26(45).
	5. The Permittee shall ensure that natural gas shall be the only fuel of use in CHP1.
	6. The Permittee shall ensure that startups and shutdowns are conducted as per manufacturer specifications.
	7. The Permittee shall operate the subject equipment consistent with the Final Standard Operating and Maintenance Procedures ("SOMP") and the conditions/parameters established during the compliance test program.
	8. The Permittee shall ensure that the NOx and CO emissions shall be monitored and recorded on a continuous basis in terms of pounds per hour. The equation that is used to calculate the NOx and CO emission rate shall include the use of the following factors and parameters: natural gas mass flow rate into the engine, the higher heating value of the natural gas, and the F-factor of 8710 dscf/MMBtu for natural gas.
	9. The Permittee shall submit to MassDEP the **startup** and **shutdown** CEMS emissions data records for NO_x and CO to be used to determine the startup and shutdown emission limits for CHP1. **The Permittee shall submit emission data generated from this compilation including proposed emission limits and durations to MassDEP within twelve (12) months of commencement of continuous operation of CHP1.** MassDEP will incorporate these limits into an Approval for CHP1 startup and shutdown emission limits and, upon issuance, said limits during such times shall be considered enforceable.
D-D	10. The Permittee shall ensure that D-D shall be equipped with a "Critical" grade exhaust silencer manufactured by GT Exhaust Systems, Model 201-5114 or equivalent, for noise suppression.
D-C, D-D, D-K	11. The Permittee shall ensure that each particulate filter is operated, maintained, and replaced according to manufacturer's recommendations and shall maintain records indicating such.
Facility-Wide	12. This Approval shall supersede Approval Nos. 77-CO-046, MBR-97-COM-006 and MBR-06-COM-001 in their entirety.

Table 6 Key:
EU# = Emission Unit Number
dscf/MMBtu = dry standard cubic feet per 1,000,000 British thermal units
NO_X = Nitrogen Oxides
CO = Carbon Monoxide
PCD = Pollution Control Device
SOMP = Standard Operating and Maintenance Procedures
CEMS = Continuous Emissions Monitoring System
DAHS =Data Acquisition and Handling System

B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each Emission Unit that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. The exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including but not limited to rain protection devices known as "shanty caps" and "egg beaters."

C. The Permittee shall install and utilize an exhaust stack with the following parameters, as contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

Table 7

EU#	Stack Height Above Ground (feet)	Stack Inside Exit Dimensions (inches)	Stack Gas Exit Velocity Range (feet per second)	Stack Gas Exit Temperature Range (^oF)
CHP1	127	24	35-70	340-375
D-C	39	16	28.2-91.4	692-862
D-D	39	20	25.1-101	563-878
D-E	44	8	45.1-185	493-981
D-F	45	10	47.4-212	591-965
D-G	47	4	15.0-79.4	600-1157
D-J	48	2	15.0-76.4	600-1157
D-K	39	20	22.9-83.0	526-759
B-1	127	42	1.8-6.9	364-440
B-2	127	42	3.7-13.2	365-390
B-3	127	42	3.6-12.9	315-340
B-4	127	42	1.6-6.5	315-340
B-5	17.5	16	1.1-4.3	340

Table 7				
EU#	**Stack Height Above Ground (feet)**	**Stack Inside Exit Dimensions (inches)**	**Stack Gas Exit Velocity Range (feet per second)**	**Stack Gas Exit Temperature Range (^{o}F)**
B-6A	38	12	13.2	340
B-6B	38	12	13.2	340
B-7	38	6	6.3	340
B-8	58	12	17	340

Table 7 Key:
EU# = Emission Unit Number
^{o}F = Degree Fahrenheit

5. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).

B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.

C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.

D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.

E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.

F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.

G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.

H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.

I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.

J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions," which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

7. APPEAL PROCESS

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Should you have any questions concerning this Plan Approval, please contact Susan McConnell by telephone at 978-694-3292, or in writing at the letterhead address.

Very truly yours,

Susan McConnell
Environmental Engineer
Bureau of Air and Waste

Susan Ruch
Deputy Regional Director
and Acting Permit Chief
Bureau of Air and Waste

copy:
Burlington Board of Health
Burlington Fire Department
MassDEP/NERO – Marc Altobelli, Mary Persky, Martha Bolis, Edward Braczyk
MassDEP/Boston - Yi Tian
Mr. Manuel Rei, REI Engineering
Mr. Thomas Wholley, VHB Vanasse Hangen Brustlin, Inc.